

# Stacking Memory Chips Using Flat Lead-Frame with Breakaway Insertion Pins and Pin-to-Pin Bridges

## Abstract

Memory chips are assembled into a stack with an insertion-pin frame between pins of two stacked memory chips. The insertion-pin frame is not bent or formed into 3-dimensional shapes but is flat, improving use in standard surface-mount processes such as solder printing onto the insertion-pin frame. Flat insertion pins held to the flat insertion-pin frame by necks are soldered to top shoulders of pins on a lower chip. Then bottom feet of pins of an upper chip are soldered to the insertion pins. The necks are punched away or broken to release the insertion-pin frame from the insertion pins that are soldered to the assembled stacked chips. An insulated wire jumper can be placed under the pins to jumper chip-select connections, or a bridge between insertion pins can be formed from the insertion-pin frame. Holding tabs to the bridge are removed with the insertion pins or by punching.